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Date: 12-10-04


Himanshu S. Amin

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of:

Applicant(s): Gary Dan Dotson

Examiner: Kimnhung T. Nguyen

Serial No: 09/672,635

Art Unit: 2674

Filing Date: September 28, 2000

Title: RASTER ENGINE WITH HARDWARE CURSOR

**Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450**

APPEAL BRIEF

Dear Sir:

Applicant's representative submits this brief in connection with an appeal of the above-identified patent application. A credit card payment form is filed concurrently herewith in connection with all fees due regarding this appeal brief. In the event any additional fees may be due and/or are not covered by the credit card, the Commissioner is authorized to charge such fees to Deposit Account No. 50-1063 [ALBRP200US].

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I. Real Party in Interest (37 C.F.R. §41.37(c)(1)(i))

The real party in interest in the present appeal is Rockwell Technologies, LLC, the assignee of the present application.

II. Related Appeals and Interferences (37 C.F.R. §41.37(c)(1)(ii))

Appellant, appellant's legal representative, and/or the assignee of the present application are not aware of any appeals or interferences which may be related to, will directly affect, or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims (37 C.F.R. §41.37(c)(1)(iii))

Claims 1-27 are currently pending in the subject application and are presently under consideration. Claims 1-3, 5-7, 14 and 21-23 stand rejected by the Examiner. Claims 4, 8-13, 15-20, and 24-27 are objected to as being dependent on rejected base claim(s). The rejection of claims 1-3, 5-7, 14 and 21-23 is being appealed.

IV. Status of Amendments (37 C.F.R. §41.37(c)(1)(iv))

No claim amendments have been entered after the Final Office Action.

V. Summary of Claimed Subject Matter (37 C.F.R. §41.37(c)(1)(v))**A. Independent Claim 1**

Independent claim 1 recites a video controller for interfacing a frame buffer to a dual scan display having adjacent first and second display portions with a display boundary therebetween, the video controller comprising a raster engine that receives video data from the frame buffer, formats the video data, and renders the formatted data to the dual scan display line by line, and a hardware cursor that selectively overlays a cursor image across the display boundary onto the first and second display portions. (*See e.g., page 6, lines 22-29*).

B. Independent Claim 5

Independent claim 5 recites a method of overlaying a cursor image onto a dual scan display in a video controller for interfacing a frame buffer to a dual scan display having adjacent first and second display portions with a display boundary therebetween, the method comprising rendering video data from the frame buffer to the dual scan display using a raster engine, and selectively overlaying a cursor image across the display boundary onto the first and second display portions according to a cursor position using a hardware cursor. (*See e.g.*, page 8, lines 10-21).

C. Independent Claim 21

Independent claim 21 recites a hardware cursor for overlaying a cursor image onto a dual scan display having adjacent first and second display portions with a display boundary therebetween. The hardware cursor comprises means for receiving video data and displaying the video data on the dual scan display (*See e.g.*, page 6, lines 25-28). The hardware cursor further includes means for concurrently overlaying a cursor image generated *via* the hardware cursor onto the first and second display portions according to a cursor position (*See e.g.*, page 6, lines 28-29).

The “means for” limitations described above are identified as limitations subject to the provisions of 35 U.S.C. §112 ¶6. The structures corresponding to these limitations are identified with reference to the specification and drawings in the above noted parentheticals.

VI. Grounds of Rejection to be Reviewed (37 C.F.R. §41.37(c)(1)(vi))

A. Claims 1-3, 5-7, 14 and 21-23 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Tjandrasuwita, *et al.* (US patent 5,422,654) in view of Santilli (US patent 5,675,361).

VII. Argument (37 C.F.R. §41.37(c)(1)(vii))

A. Rejection of Claims 1-3, 5-7, 14 and 21-23 Under 35 U.S.C. §103(a)

Claims 1-3, 5-7, 14 and 21-23 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Tjandrasuwita, *et al.* (US 5,422,654) in view of Santilli (US 5,675,361). Withdrawal of this rejection is respectfully requested for at least the following reasons. Neither Tjandrasuwita, *et al.* nor Santilli, alone or in combination, teach or suggest all the limitations as recited in the subject claims.

To reject claims in an application under §103, an examiner must establish a *prima facie* case of obviousness. A *prima facie* case of obviousness is established by a showing of three basic criteria. First, *there must be some suggestion or motivation*, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, *to modify the reference or to combine reference teachings*. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See MPEP §706.02(j) (emphasis added). The teaching or suggestion to make the claimed combination and the reasonable expectation of success *must both be found in the prior art and not based on applicant's disclosure*. See *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (emphasis added). Furthermore, the mere fact that the reference can be modified does not render the modification obvious unless the cited art also suggests the desirability of the modification. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

In particular, neither Tjandrasuwita, *et al.* nor Santilli teach or suggest a *hardware cursor that selectively overlays a cursor image across a display boundary onto... first and second display portions... of a dual scan display* as recited in independent claims 1, 5, and 21. The invention as claimed facilitates reduction of computational overhead associated with conventional software cursor display systems and methods utilized in dual scan displays. Dual scan displays provide faster refresh

rates than conventional single scan displays by dividing the display region into two segments that are refreshed at substantially the same time by utilizing separate data paths corresponding to each segment. In particular, high-speed refresh rates are made possible *via* dividing a display region into two segments that are refreshed at a substantially similar time, wherein separate data paths, one corresponding to each display region, are employed. For instance, a first data path can be utilized to deliver display data to a first display segment of a dual scan display, and a second data path can be employed to deliver display data to a second segment of the dual scan display. In conventional dual-scan display systems, software cursors are employed to enable display of a cursor currently on multiple segments of dual-scan displays. Such software cursors, however, are associated with substantial processing overhead. The subject invention as claimed reduces such overhead by employing *a hardware cursor that selectively overlays a cursor image across a display boundary onto... first and second display portions... of a dual scan display.*

To more fully illustrate disparities between the invention as claimed and the cited references, a detailed description of a **hardware cursor** and operations associated therewith is provided herein. Hardware cursors are conventionally employed in single scan displays to reduce processing overhead associated with software cursors. In typical cursor display systems (both hardware cursor display systems and software cursor display systems), information to be displayed is stored in a video memory that is read by a display controller, and the display controller generates images based upon such information. The video memory is structured such that a physical location of a display corresponds to a specific portion of video memory. Referring particularly to software cursor implementations, a cursor must be "redrawn" in video memory each time it translates to a disparate location, and display information previously covered by the cursor must be refreshed. Such repeated redrawing requires a great deal of processing power, and therefore adversely affects performance.

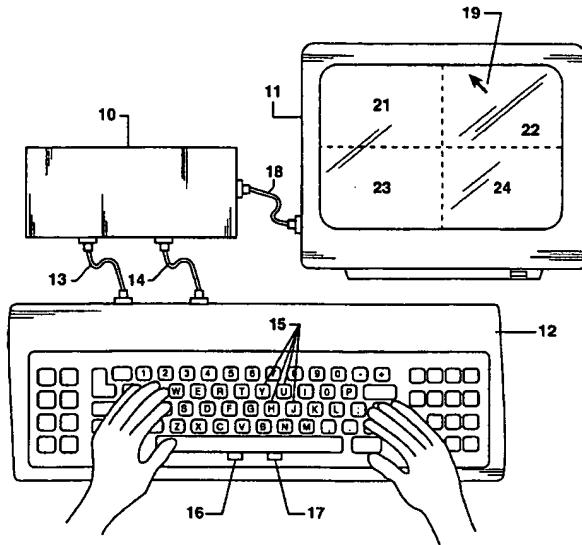
In contrast to software cursor display systems, hardware display systems store information describing a single cursor representation in a predetermined location of video memory. Information that describes a screen image (without the cursor representation) is stored elsewhere in video memory. Information from the cursor portion of video memory

can then be combined with the information describing the screen image to produce a final display image. In such hardware cursor display systems, when a cursor position is altered, cursor placement does not affect non-cursor information in memory, and the position of a cursor in relation to a screen image can be stored in a register. As a display controller scans video memory it compares a value in the register corresponding to cursor position with its current location in video memory. When the display controller reaches the location of the cursor in memory, it reads the information in the cursor portion of video memory rather than the information that describes the screen image at that point. Thus, utilizing hardware cursor systems, display information need not be constantly refreshed (thereby reducing processing overhead).

In contrast to the subject claimed invention, Tjandrasuwita, *et al.* discloses a dual scan display, but nowhere does the aforementioned reference disclose, teach, or suggest utilizing **a hardware cursor to selectively overlay a cursor image across a display boundary onto first and second display portions... of a dual scan display**. Describing Tjandrasuwita, *et al.* with more particularity, a system and method are disclosed that employ cathode ray tube (CRT) data streams to generate a dual scan display including a first display region adjacent to a second display region. Utilizing the systems/methods of Tjandrusawita, *et al.*, a greater number of gray level patterns can be displayed on a dual scan display when compared to previous dual scan display systems and/or methodologies. Again, however, (and the Examiner concedes as much), Tjandrusawita, *et al.* does not disclose, teach, or suggest **a hardware cursor**, much less **a hardware cursor that selectively overlays a cursor image across a display boundary onto... first and second display portions... of a dual scan display** as recited in the subject claims. Accordingly, to make up for this deficiency, the Examiner cites Santilli.

Santilli discloses a system that enables a user to dynamically position a cursor over a display, wherein the user is not required to remove their hands from a keyboard to effectuate such of the cursor. More particularly, Santilli discloses that a block of keys can include position sensors, and the cursor is moveable with respect to sensed positions of fingers on the keys. Fig. 1 of Santilli is reproduced below to better illustrate the systems/methods described therein.

FIGURE 1



Santilli teaches that a display can be partitioned into four quadrants (21), (22), (23), and (24), wherein a particular key is assigned to each quadrant to facilitate movement of the cursor. For example, Santilli teaches that "Y", "U", "H", and "J" keys (15) on a keyboard can include position sensors, wherein sensed movement of a finger on the "Y" key controls movement of a cursor (19) in an upper-left quadrant (21) of the display, sensed movement of a finger on the "U" key controls movement of the cursor (19) in an upper-right quadrant (22) of the display, sensed movement of a finger on the "H" key controls movement of the cursor (19) in a lower-left quadrant (23) of the display, and sensed movement of a finger on the "J" key controls movement of the cursor (19) in a lower-right quadrant (24) of the display. There is no indication within Santilli, however, that the display is a *dual scan display*, or that the cursor (19) is a *hardware cursor* as claimed. Specifically, Santilli nowhere utilizes the term "hardware cursor" or similar language to describe the cursor (19) relied upon by the Examiner. Rather, Santilli specifically discloses utilization of software to assist in positioning the cursor (19) on a quadrant of the display at col. 10, lines 51-55, which states:

... any type of software to aid pointing as is typically used with mice and other pointing devices can be used in conjunction with this invention. For example, some software lets the cursor "jump" to a function when the cursor is positioned close to it.

To even further distinguish the claims as recited from Santilli, the cited reference does not disclose, teach, or suggest that the display is a *dual scan display*. In contrast, and as described above, Santilli merely states that the display is divided into four quadrants, wherein disparate keys are employed to move the cursor within each quadrant. Nowhere in Santilli, however, is there a disclosure, teaching, or suggestion that the display is a *dual scan display* as claimed.

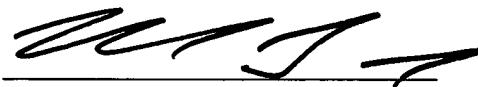
As the teaching or suggestion to make the claimed combination must both be found in the cited references under *In re Vaeck*, 947 F.2d 488 (Fed. Circuit, 1991), and neither Tjandrasuwita, *et al.* nor Santilli teach or suggest *means for concurrently overlaying a cursor image generated via the hardware cursor onto the first and second display portions*, it is readily apparent that the rejection of claims 1, 5, and 21 (and claims 2-3, 6-7, 14 and 22-23 which depend therefrom) should be withdrawn.

C. Conclusion

For at least the above reasons, the claims currently under consideration are believed to be patentable over the cited references. Accordingly, it is respectfully requested that the rejections of claims 1-3, 5-7, 14 and 21-23 be reversed.

If any additional fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063.

Respectfully submitted,
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VIII. Claims Appendix (37 C.F.R. §41.37(c)(1)(viii))

1. A video controller for interfacing a frame buffer to a dual scan display having adjacent first and second display portions with a display boundary therebetween, the video controller comprising:

a raster engine that receives video data from the frame buffer, formats the video data, and renders the formatted data to the dual scan display line by line; and

a hardware cursor that selectively overlays a cursor image across the display boundary onto the first and second display portions.

2. The video controller of claim 1, the raster engine comprises first and second data paths respectively associated with the first and second display portions, and the hardware cursor overlays a first portion of the cursor image onto the first display portion and overlays a second portion of the cursor image onto the second display portion if the cursor crosses the display boundary.

3. The video controller of claim 2, the hardware cursor selectively inserts first portion cursor data associated with the first portion of the cursor image into the first data path of the raster engine, selectively inserts second portion cursor data associated with the second portion of the cursor image into the second data path of the raster engine if the cursor crosses the display boundary.

4. The video controller of claim 3, wherein the raster engine comprises a vertical counter with first and second vertical counter values respectively indicating first and second lines of formatted data being rendered to the first and second display portions, and a horizontal counter with a horizontal counter value indicating the column of formatted data being rendered to the display;

wherein the hardware cursor comprises a first cursor start address register with a first cursor start address indicating a first cursor portion starting line in the first display portion, a second cursor start address register with a second cursor start address indicating a second cursor portion starting line in the second display portion, a first cursor portion height register with a first cursor portion height value indicating a first cursor portion height, a second cursor portion height register with a second cursor portion height value indicating a second cursor portion height, a cursor column register with a cursor column start value, and a cursor image width register with a cursor image width value indicating a cursor image width;

wherein the hardware cursor comprises a cursor state machine that compares the first vertical counter value with the first cursor start address and the first cursor portion height value, compares the second vertical counter value with the second cursor start address and the second cursor portion height value, and compares the horizontal counter value with the cursor column start value and the cursor image width value; and

wherein the hardware cursor comprises a cursor line buffer that selectively inserts first portion cursor data associated with the first portion of the cursor image into the first data path of the raster engine according to the comparison of the first vertical counter value with the first cursor start address and the first cursor portion height value and the comparison of the horizontal counter value with the cursor column start value and the cursor image width value, and selectively inserts second portion cursor data associated with the second portion of the cursor image into the second data path of the raster engine according to the comparison of the second vertical counter value with the second cursor start address and the second cursor portion height value and the comparison of the horizontal counter value with the cursor column start value and the cursor image width value, if the cursor crosses the display boundary.

5. A method of overlaying a cursor image onto a dual scan display in a video controller for interfacing a frame buffer to a dual scan display having adjacent first and second display portions with a display boundary therebetween, the method comprising:

rendering video data from the frame buffer to the dual scan display using a raster engine; and

selectively overlaying a cursor image across the display boundary onto the first and second display portions according to a cursor position using a hardware cursor.

6. The method of claim 5, further comprising determining whether the cursor image crosses the display boundary according to the cursor position.

7. The method of claim 6, further comprising:

determining first and second portions of the cursor image if the cursor image crosses the display boundary;

overlaying the first portion of the cursor image onto the first display portion if the cursor crosses the display boundary; and

overlaying the second portion of the cursor image onto the second display portion if the cursor crosses the display boundary.

8. The method of claim 7, wherein determining the first portion of the cursor image comprises:

comparing a first vertical counter value in the raster engine with a first cursor start address and a first cursor portion height value in the hardware cursor; and

comparing a horizontal counter value in the raster engine with a cursor column start value and a cursor image width value in the hardware cursor.

9. The method of claim 8, wherein determining the second portion of the cursor image comprises:

comparing a second vertical counter value in the raster engine with a second cursor start address and a second cursor portion height value in the hardware cursor; and

comparing the horizontal counter value in the raster engine with the cursor column start value and the cursor image width value in the hardware cursor.

10. The method of claim 9, wherein overlaying the first portion of the cursor image onto the first display portion comprises selectively inserting first portion cursor data associated with the first portion of the cursor image into a first data path of the raster engine according to the comparison of the first vertical counter value with the first cursor start address and the first cursor portion height value and the comparison of the horizontal counter value with the cursor column start value and the cursor image width value.

11. The method of claim 8, wherein overlaying the first portion of the cursor image onto the first display portion comprises selectively inserting first portion cursor data associated with the first portion of the cursor image into a first data path of the raster engine according to the comparison of the first vertical counter value with the first cursor start address and the first cursor portion height value and the comparison of the horizontal counter value with the cursor column start value and the cursor image width value.

12. The method of claim 9, wherein overlaying the second portion of the cursor image onto the second display portion comprises selectively inserting second portion cursor data associated with the second portion of the cursor image into a second data path of the raster engine according to the comparison of the second vertical counter value with the second cursor start address and the second cursor portion height value and the comparison of the horizontal counter value with the cursor column start value and the cursor image width value.

13. The method of claim 10, wherein overlaying the second portion of the cursor image onto the second display portion comprises selectively inserting second portion cursor data associated with the second portion of the cursor image into a second data path of the raster engine according to the comparison of the second vertical counter value with the second cursor start address and the second cursor portion height value and the comparison of the horizontal counter value with the cursor column start value and the cursor image width value.

14. The method of claim 5, further comprising:

- determining first and second portions of the cursor image if the cursor image crosses the display boundary;
- overlaying the first portion of the cursor image onto the first display portion if the cursor crosses the display boundary; and
- overlaying the second portion of the cursor image onto the second display portion if the cursor crosses the display boundary.

15. The method of claim 14, wherein determining the first portion of the cursor image comprises:

- comparing a first vertical counter value in the raster engine with a first cursor start address and a first cursor portion height value in the hardware cursor; and
- comparing a horizontal counter value in the raster engine with a cursor column start value and a cursor image width value in the hardware cursor.

16. The method of claim 15, wherein determining the second portion of the cursor image comprises:

- comparing a second vertical counter value in the raster engine with a second cursor start address and a second cursor portion height value in the hardware cursor; and
- comparing the horizontal counter value in the raster engine with the cursor column start value and the cursor image width value in the hardware cursor.

17. The method of claim 16, wherein overlaying the first portion of the cursor image onto the first display portion comprises selectively inserting first portion cursor data associated with the first portion of the cursor image into a first data path of the raster engine according to the comparison of the first vertical counter value with the first cursor start address and the first cursor portion height value and the comparison of the horizontal counter value with the cursor column start value and the cursor image width value.
18. The method of claim 15, wherein overlaying the first portion of the cursor image onto the first display portion comprises selectively inserting first portion cursor data associated with the first portion of the cursor image into a first data path of the raster engine according to the comparison of the first vertical counter value with the first cursor start address and the first cursor portion height value and the comparison of the horizontal counter value with the cursor column start value and the cursor image width value.
19. The method of claim 16, wherein overlaying the second portion of the cursor image onto the second display portion comprises selectively inserting second portion cursor data associated with the second portion of the cursor image into a second data path of the raster engine according to the comparison of the second vertical counter value with the second cursor start address and the second cursor portion height value and the comparison of the horizontal counter value with the cursor column start value and the cursor image width value.
20. The method of claim 17, wherein overlaying the second portion of the cursor image onto the second display portion comprises selectively inserting second portion cursor data associated with the second portion of the cursor image into a second data path of the raster engine according to the comparison of the second vertical counter value with the second cursor start address and the second cursor portion height value and the comparison of the horizontal counter value with the cursor column start value and the cursor image width value.

21. A hardware cursor for overlaying a cursor image onto a dual scan display having adjacent first and second display portions with a display boundary therebetween, comprising:

means for receiving video data and displaying the video data on the dual scan display; and

means for concurrently overlaying a cursor image generated *via* the hardware cursor onto the first and second display portions according to a cursor position.

22. The hardware cursor of claim 21, further comprising means for determining whether the cursor image crosses the display boundary according to the cursor position.

23. The hardware cursor of claim 21, further comprising:

means for determining first and second portions of the cursor image if the cursor image crosses the display boundary;

means for overlaying the first portion of the cursor image onto the first display portion if the cursor crosses the display boundary; and

means for overlaying the second portion of the cursor image onto the second display portion if the cursor crosses the display boundary.

24. The hardware cursor of claim 23, wherein the means for determining the first portion of the cursor image comprises:

means for comparing a first vertical counter value in the raster engine with a first cursor start address and a first cursor portion height value in the hardware cursor; and

means for comparing a horizontal counter value in the raster engine with a cursor column start value and a cursor image width value in the hardware cursor.

25. The hardware cursor of claim 24, wherein the means for determining the second portion of the cursor image comprises:

means for comparing a second vertical counter value in the raster engine with a second cursor start address and a second cursor portion height value in the hardware cursor; and

means for comparing the horizontal counter value in the raster engine with the cursor column start value and the cursor image width value in the hardware cursor.

26. The hardware cursor of claim 25, wherein the means for overlaying the first portion of the cursor image onto the first display portion comprises means for selectively inserting first portion cursor data associated with the first portion of the cursor image into a first data path of the raster engine according to the comparison of the first vertical counter value with the first cursor start address and the first cursor portion height value and the comparison of the horizontal counter value with the cursor column start value and the cursor image width value.

27. The hardware cursor of claim 26, wherein the means for overlaying the second portion of the cursor image onto the second display portion comprises means for selectively inserting second portion cursor data associated with the second portion of the cursor image into a second data path of the raster engine according to the comparison of the second vertical counter value with the second cursor start address and the second cursor portion height value and the comparison of the horizontal counter value with the cursor column start value and the cursor image width value.

IX. Evidence Appendix (37 C.F.R. §41.37(c)(1)(ix))

None.

X. Related Proceedings Appendix (37 C.F.R. §41.37(c)(1)(x))

None.